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Experienced Teachers' Expectations about the Potential Effectiveness of Spelling Exercises

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In order to investigate what issues might be important for experimental training research, a group of experienced remedial teachers was asked to evaluate the potential effectiveness of various spelling exercises. After addressing some general questions about spelling exercises for Dutch poor spellers, they made rankings of several sets of exercises on the basis of the expected effectiveness. The teachers had to give their responses based on their own experiences and with a specific child with poor spelling in mind. The results show that the teachers emphasize the importance of providing rules in spelling exercises, but also agree that poor spellers often have serious difficulties in applying these rules in spelling. Furthermore, the rankings show that exercises with a combination of rule-based strategies and showing the whole orthographic pattern of the word are considered to be most effective. Learning to memorize the word without showing the spelling of the word was considered to be the least effective. Surprisingly, individual characteristics of the children did not seem to have any influence on the ranking of the exercises. It is concluded that exploiting the experience and knowledge of teachers may be good, but is only the first step for further research on the effectiveness of exercises for poor spellers.

With modern communication systems like e-mails and Internet exchanges, written communication goes fast and not much attention is paid to the correct spelling of words. Although spelling errors might not bother friends and relatives, correct spelling is still needed in formal letters and official documents. Therefore, learning to spell correctly is still important. Practicing spelling also has other benefits such as

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helping to acquire word recognition skills, segmentation, decoding unfamiliar words, oral blending, and reading (Berninger, Abbott, Rogan, Reed, Abbott, Brooks, Vaughn, & Graham, 1998; Ehri, 1989, 1997; Foorman & Francis, 1994; Graham, Harris, & Chorzempa, 2002; Uhry & Shepherd, 1993). Spelling instruction helps to form connections between the graphemes and phonemes of a word, to increase the knowledge about the alphabetic system, and, therefore, is not just important for spelling itself, but also for reading and for processes related to reading and spelling (Ehri, 1989, 1997). Despite the relative importance of spelling instruction, some children consider spelling training as a rather boring subject. Recent instructional methods and curricula for spelling in the Netherlands have tried to improve the attractiveness of the spelling exercises by introducing a rich variety of exercises with, for example, many pictures and games. Appealing spelling exercises may motivate children to do the exercises, but there is, of course, no guarantee that the spelling ability itself will improve. Providing effective spelling exercises is quite important, especially for poor spellers who often have to spend a lot of time practicing. It is, therefore, surprising that only little research has been done to examine the effects of spelling exercises on poor spellers.

EFFECTIVE SPELLING EXERCISES

Studies by van Daal (1993) and Bosman and De Groot (1992) have examined the effects of copying words and writing words from memory. The first study found copying to be the most effective while the other study found writing from memory to be the most effective exercise. A recent replication study (Bos & Reitsma, in preparation) showed that in the short term, poor spellers profit most from copying but in the long term, both typing exercises—writing from memory as well as copying—have the same effect on spelling. Some other studies showed that several strategies, like visual and phonetic strategies, are helpful in improving spelling performance. Apart from visual and phonetic strategies (Lennox & Siegel, 1996; Steffler, Varnhagen, Friesen, & Treiman, 1998), emphasizing the meaningful elements that form words (morphology), providing a meaningful context (semantics), and instruction in how to use the different strategies have also shown to be helpful to improve the spelling of children (Abbott, 2000; Butyniec-Thomas & Woloshyn, 1997; Foorman, Novy, Francis, &

Liberman, 1991; Kernaghan & Woloshyn, 1995; O'Conner & Padeliadu, 2000).

Although some initial empirical evidence is available on the issue of the kind of exercises and instructions that could be beneficial for poor spellers, scientific knowledge does not yet allow us to make strong, evidence-based recommendations. Further research is needed, for example, by contrasting various types of exercises in controlled training studies. One can, however, also argue that there might already be a rich knowledge base available: the expertise of teachers. Because the focus of our research question is on poor spellers, we investigated the expertise of remedial teachers who have experience in working with moderate to serious disabilities in learning to read and spell. There is some evidence that students of more experienced teachers perform better. For example, in a study by McCutchen, Harry, Cunningham, Cox, Sidman, and Covill (2002), phonological knowledge of teachers is positively related to reading performance of their students. It seems reasonable then to assume that experience and expertise in providing training in spelling can also have positive influences on children. Normal elementary school teachers (from Grade 2 to Grade 5) do not seem to have sufficient knowledge about effective spelling instruction (Johnston, 2001). In contrast, specialized teachers with much experience in spelling remediation may demonstrate detailed and adequate knowledge of the type of exercises that is effective. Our research question is, therefore, to investigate the potential effect of various spelling exercises by querying the expertise of these teachers. The expectations of experienced remedial teachers may be an important source of information for evaluating the relative merits of spelling exercises and may provide a sound perspective for further, more rigorous research. To capitalize on the knowledge and the ideas of the experts, we used both a questionnaire and a series of examples of actual exercises, which they had to rank in terms of expected effectiveness.

ELEMENTS OF SPELLING EXERCISES

As was mentioned earlier, Dutch methods of spelling instruction consist of a rich variety of spelling exercises. Although these exercises differ in content, format, and attractiveness, several elements appear to be quite consistently present in the exercises (Bos & Geelhoed, 2001). In a previous study (Bos & Reitsma, in press), four of these elements were analyzed.

The first element we could identify is the strategy of spelling that is emphasized and three options can be distinguished: 1) phoneme-grapheme correspondences (PGCs) and rules, 2) analogy, and 3) memorizing. The strategy of using PGCs helps the child find the correct spelling for words with regular phoneme-grapheme correspondences. In Dutch spelling instruction, this approach is often referred to as using the rule "write down the word according to its sounds," which is a useful strategy in the rather transparent Dutch language. Other rules concern the reduction of vowels and the doubling of consonant letters in multisyllabic words. The analogy strategy can be used to write similar words correctly, with an instruction such as "write the word like *the example word*". For example, if a word like *mouse* had to be written correctly, the word *house* could be used as an example word. The memorizing strategy helps the child remember the correct spelling by heart. This can be established by writing the words repeatedly with an instruction like "write the word five times."

The second element of spelling exercises is "producing the word" with the following options: 1) writing all the letters of the word, 2) writing only some letters of the word, and 3) not writing any letters at all. For example, the instruction of an exercise could ask the child to write down the whole word (*knee*). Or the child could have to fill in the missing letters of the ambiguous part of the word (*...ee*). If the child does not need to write any letters at all, the correct writing of the word is shown together with, for example, the wrong spelling of the word and the child has to mark the correct writing (*knee* versus *nee*).

The third element analyzed is "the information provided about the spelling of the word" in the exercise: 1) showing the complete spelling of the word, 2) showing only some letters, or 3) showing no letters at all. In the first option, the child could see the whole word (e.g. *knee*); in the second option, only the nonambiguous letters of the word are shown (*---ee*); and in the third option, other information is needed in order to know what word to write like a picture or the pronunciation of the word.

The fourth and final element can be termed "word features," that is, the features of words that are central in the exercise. Four options can be distinguished: semantic, phonological, morphological, and orthographic. The semantics of a word is emphasized by providing pictures or by showing the words in a story context. Phonology is focused by presenting words that rhyme or by training the segmentation of the word into its

sounds. The morphology of words is addressed by asking learners to divide the words in their meaningful parts. Finally, the orthography of the word is accentuated by only showing the spelling of words without any extra features.

The rankings of our previous study showed that the teachers considered the rule and PGC strategy to be the most effective strategy and rote memorizing to be the least effective. With respect to the element "information provided about the spelling of the word," presenting the whole word was considered to be the most effective option. No agreement was found on the elements "producing the word" and "word features." However, in this previous study, the several elements were not combined so only the effects of the options within one specific element could be examined. In the current study, we decided to combine different elements. It would be too difficult for teachers to rank all (4) elements by (3 or 4) options of each. Obviously, the number of exercises to evaluate would become too large. Therefore, only the options of two elements were contrasted: 1) strategy (rules, analogy, and memorizing), and 2) information provided about the spelling of the word (showing all the letters of the word, some letters, or no letters at all). Combining these elements could provide information about what element is most important and what combination of elements could be considered as most effective. Phonological and semantic features (pronunciation and pictures) were added in order to find out which of these were also considered to be important. Furthermore, since different studies had emphasized the importance of providing feedback (Kearney & Drabman, 1993; Perkins, 1988), feedback was included as a distinguishing feature in the exercises.

PRINCIPLES OF DUTCH SPELLING

Because the study is carried out with Dutch remedial teachers working with children who have serious problems in learning to spell Dutch words correctly, a brief explanation on the particular orthography is needed. In contrast to English, the Dutch orthography is highly consistent in the direction from grapheme to phoneme and does not generally yield major obstacles for the beginning reader (Reitsma, 1990a, 1990b; Wesseling & Reitsma, 2000, 2001). The orthography is less consistent, however, in the direction from phoneme to grapheme. Dutch orthography is based on three principles: 1) spelling-to-sound, 2) analogy, and 3) etymology, and there are two rules for the reduction and doubling of vowel and consonant characters in open and closed syllables.

The dominant alphabetic principle of Dutch spelling is the spelling-to-sound principle, which says that the graphemes of a word should clearly represent the phonological structure of the word. Words that are primarily based on this principle can be written correctly by using phoneme-grapheme correspondences. According to the complexity of the phonological structure, one can distinguish words ranging from simple monosyllabic words like *roos* (rose) to multisyllabic words with one or more consonant clusters. A prime example of the latter is a word like *herfststorm* (autumn storm) where six consonants appear in succession.

The second principle of Dutch orthography is the analogy principle stating that words or morphemes should be spelled consistently. Words that are spelled in line with this principle may partly deviate from a strict application of the spelling-to-sound principle. For example, a word like *honden* (dogs) has an obvious /d/ sound; therefore, the grapheme at the end of the singular form *hond* (dog) has to be written with a *d* although the final sound of *hond* is /t/. Furthermore, an *r* at the end of a word has an effect on the pronunciation of the proceeding vowel. For example, although the pronunciation of the Dutch *ee* is usually /e/, like in *meel* (flour) and *leeg* (empty), in words like *beer* (bear), the *ee* is rather pronounced as /I/. Finally, the Dutch word *grootte* (greatness) sounds similar to *grote* (broad), but is written in analogy to *dikte* (thickness).

The third principle in Dutch orthography is the principle of etymology, implying that spellings can be based on former differences in pronunciations. The pronunciations of the words that are based on this principle have changed over time, so the correct spelling of these words can no longer be produced on the basis of phoneme-grapheme correspondences. For example, although the sound of the vowels in words like *pauw* (peacock) and *fout* (wrong) used to be different in early days, the sounds of the vowels are nowadays the same, but different graphemes are used for such etymological reasons.

Finally, there are two spelling rules for the reduction and doubling of vowel and consonant characters and closed syllables. Generally, long vowels are spelled with a double letter (e.g., *aa*) whereas short vowels are spelled with a single letter (*a*). The first main rule expresses that a long final vowel in an open syllable must be spelled with only one character instead of the regular geminated grapheme. For example, the word *raam* (window) is spelled in plural form as *ramen* (sounding as /r/a/-/m/ə/n/). The other main rule determines that a consonant

between two vowels has to be doubled if the preceding vowel is short. For example, the plural form of the word *bot* (/bot/, bone) is *botten*. As usual, some exceptions to these rules exist. Although the rules do not seem too difficult and allow for an algorithmic solution, they appear to be a main source of spelling errors in school-aged children.

EVALUATING SPELLING EXERCISES

Whereas in English it is quite important to emphasize the morphemic consistencies in words and to learn common words and spelling patterns by heart (e.g., Berninger, Vaughn, Abbott, Begay, Coleman, Curtin, Hawkins, & Graham, 2002), the regular Dutch spelling system allows or even instigates a heavy reliance on phoneme-grapheme correspondences, as in several other European orthographies (e.g., de Jong & van der Leij, 2003; Landerl & Wimmer, 2000; Wesseling & Reitsma, 2000, 2001). However, even in the transparent Dutch orthography, instructions on regular phomene-grapheme correspondences are far from sufficient to learn correct spelling and adequate spelling strategies. As outlined in the last section, knowledge about rules and word-specific orthographic knowledge is indispensable for fluent reading and correct spelling (see also Reitsma, 1990a, 1990b). Therefore, we expect that remedial teachers have a balanced view in choosing types of exercises by not only emphasizing the phonology of the words and the use of PGCs, but also to help poor spellers employ the various rules and make proper use of analogies.

In the present study, teachers were presented with examples of spelling exercises and were asked to rank them in terms of potential effectiveness. In the presented examples, the strategy and the information shown with regard to the spelling of the word were systematically varied. Expectations about the potential effectiveness of spelling exercises, of course, depends heavily on the type of words to be practiced or spelling problem to be dealt with. For words that exemplify the different principles of Dutch spelling, different kinds of exercises would be considered to be most effective. For example, using the PGC strategy is likely to be considered as the most helpful for regularly spelled words. Words with unpredictable spellings (for etymological reasons) need to be learned by heart, so we expect the memorizing strategy to be considered as the most effective for these words. We predict that teachers will expect most benefit from the analogy strategy for words that are spelled according to the analogy principle and would probably benefit most from the corresponding

strategy. For bisyllabic words with doubling of consonants or deleting vowel characters, spelling exercises presenting a rule-based strategy should be preferred. In order to analyze the effects of word type on teachers' judgments of the most appropriate approaches, we systematically selected words based on the various spelling principles in the examples of exercises presented to the teachers.

One of the essential ingredients for appropriate exercises is, of course, that children need to first recognize the type of spelling problems in order to spell the word correctly. Therefore, showing a suitable strategy is probably more helpful than offering only information about the spelling of the word (Anderson, 1985; Butyniec-Thomas & Woloshyn, 1997). Additionally, in our previous study, semantic elements were preferred to phonological elements, but this might have been a result of incomplete counterbalancing of word features and attractiveness of the exercises. In the present study, we expect that exercises focusing on phonological aspects are considered generally as the most important because of the relative transparent nature of the orthography.

Furthermore, whether the complete spelling should be shown or only a part of the word may be considered as the most effective may depend largely on the strategy required. For example, in an exercise in which a rule strategy is thought to be appropriate, showing only a part of the word is probably the most effective because the child then has to focus more closely on the rule. On the other hand, an exercise where a memorizing strategy is called for, the complete letter string of the word should be presented for studying and copying several times. As it was found in our previous study, we expected that in most of the exercises, a combination of the memorizing strategy and no information about the writing of the word would be considered as the least effective exercise.

Because specialized remedial teachers frequently report that they apply individual difference assumptions to individualize treatment options, the participants were asked to give their responses according to their experiences with a specific child, and to first describe the kind of spelling problems and associated problems of the child. If they individualize strategies for individual differences by types of disability, then their preferences for type of exercises, and for designated elements and features, would vary accordingly. Certain forms of instruction may be more appropriate for certain learners, either defined by level of spelling skill or by some other aptitude, than for others. For example, exercises with the rule strategy might be considered as ineffective for children

with problems in applying spelling rules. In short, we expected that individual differences between the poor spellers would have an influence on the rankings of the exercises by the participants.

METHOD

PARTICIPANTS

Thirty-seven participants living in or near Amsterdam with at least two years' experience as a certified remedial teacher were recruited. A list of qualified members of the National Organization of Remedial Teachers was used to contact the teachers. They were selected on the basis of their specific experience in helping children with problems in learning to read and spell. First, a letter was sent to ask for their participation. After a week, each participant was called to inquire whether he or she agreed to participate and to make an appointment. The participating teachers all had considerable experience in offering intensive and individualized help to students with serious problems in learning to read and spell. The average number of years the teachers had experience in such remedial work was 8.9 years (SD = 5.3 years, range: 2–25 years). All but two participants were female.

MATERIALS

The materials used in this study consisted of a questionnaire and various sets of exercises. The questionnaire was presented in two parts: one part was given before studying and ranking of the exercises, and afterwards the second part of the questionnaire was given. In the first part of the questionnaire, the participants were asked to give further responses based on their experience with a child of about 10 years of age and a delay in the development of spelling of about two years relative to normal development. First, the participants were asked to describe the most important characteristics of the particular child they each had in mind. Then they had to describe in detail the type of spelling exercises and procedures they found to be most helpful for this child. In the second part of the questionnaire, the participants were asked to comment on the proposition "rules are beneficial for poor spellers." After that, the number of years of experience they had been active as remedial teachers were verified, and finally, they were allowed to give general comments and final remarks on issues concerning the remediation of spelling problems.

The teachers were also asked to rank 12 sets of nine exercises each in terms of their potential effectiveness. For each set

of nine exercises, the teachers had to point out which three exercises they considered to be the most effective and which ones they considered to be the least effective for the poor speller they each had in mind. The exercises could not actually be carried out, but were shown and described to the teachers in sufficient detail so as to make clear the objectives, format, and procedure of each exercise.

In the 12 sets of exercises, 12 different types of words were used based on the principles of Dutch orthography and rules for spelling certain bisyllabic words. The words that could be spelled correctly by applying regular PGCs were: 1) words with simple consonant-vowel-consonant structures like *roos* (rose), and 2) complex word structures like *kwast* (brush). Words in which analogies are used or can be used for a correct spelling were: 1) words ending with a *d* but sounding as a /t/ like *hond* (dog), 2) words starting with the prefixes *be-*, *ge-*, and *ver-*, but sounding as /b/ə/, /g/ə/, and /v/ə/r/, like *verhaal* (story), 3) words with *-eer*, *-oor*, and *-eur* in which the vowel changes because of the final *r*, like *beer* (bear), 4) words ending with *-ig* sounding as the Dutch /ə/g/ like *gelukkig* (happy), and 5) words in which *s* changes to *z* in plural form, like *huis - huizen* (house - houses). The following words in which etymology determines the spelling were chosen: 1) words with the grapheme *au* like *pauw* (peacock) in which the sound of the grapheme *au* is the same as the sound of the grapheme *ou*, 2) words with an *i* like *visite* (visit), in which the sound of the grapheme *i* is the same as to the sound of the grapheme *ie*, like *rivier* (river), and 3) words starting with a *c*, in which the sound of the grapheme *c* is either the same as the sound /k/ like *clown* (clown), or the same as the sound /s/ like *cider* (cider). Finally, bisyllabic words in which the two rules on vowel reduction and consonant doubling are employed: 1) words in which a vowel needs to be deleted at the end of an open syllable like *raam - ramen* (window - windows), and 2) words in which a consonant between two vowels needs to be doubled if the first vowel is short, like *bot - botten* (bone - bones).

As mentioned before, the 12 sets of exercises were constructed using the 12 types of words as described above. Only one type of words was shown per set, so that within one set of exercises, no contrast between spelling problems or possible exceptions to rules occurred. Each set consisted of nine spelling exercises that presented four words, corresponding pictures, and next to each picture the "pronunciation" of the word was simulated by showing the word between quotation marks. At

the top of each exercise, the usual and appropriate instruction was provided: to pay good attention, to cover the letters after the word was studied if information about the spelling of the word was shown, to write the words by heart, and that after spelling a word feedback would be provided. Each set consisted of nine exercises. This number of exercises was obtained by combining the three different strategies (analogy, rule, and memorizing) with the three options of showing information about the spelling (showing the word completely, partially, or not at all). For example, in the set with the *-eer, -oor,* and *-eur* words (based on analogy), in each of the nine exercises, four similar words were presented like *beer, boor, deur,* and *speer* (bear, drill, door, spear). In three of the nine exercises, a rule strategy was prompted by providing an instructional rule such as "the *r* is teasing in words with *-eer, -oor,* and *-eur.*" Such rules are commonly used in Dutch spelling curricula for these kinds of words. In three other exercises, the analogy strategy was prompted by the sentence "write the words like *meer.*" In the remaining exercises, the memorizing strategy was induced by asking learners to "write the words five times."

Within each strategy, three options of showing information about the spelling of the words were available. For example, in the rule strategy, one exercise showed the complete word (e.g. *beer*), another exercise showed only the nonambiguous part of the word (e.g., *b*---), and the remaining exercise showed no letters at all, with only dashes shown (----). Although in three of the nine exercises no information about the spelling of the word was provided, children still could know what word to spell because a picture and the pronunciation of the word were also provided. Furthermore, in each exercise, it was indicated that feedback would be provided after spelling the words so that it was clear that errors were corrected all the time. Thus, repetition of errors could be prevented in an exercise focussing on the memorizing strategy and in which no information about the spelling of the word was given beforehand.

The words that were selected in the exercises for inducing the analogy strategy were generally more similar than the words in the other exercises. For example, in comparison with words mentioned before, *beer, speer, veer, peer* were used for the analogy strategy. In exercises with a focus on rule or memorizing strategy, less similar words were used like *beer, boor, deur,* and *speer* (bear, drill, door, and spear). This small distinction in selected words was thought to help invoke the analogy strategy, if necessary.

All exercises were printed on paper and laminated. The sets of exercises were randomized in different ways, and four different orders of presenting the sets were used for about equal numbers of participants.

PROCEDURE

Each participant was interviewed individually. The interview started with the first part of the questionnaire and the experimenter noted the answers. After completing the first part of the questionnaire, the ranking of the exercises began. First, the experimenter gave an example of a set of exercises and demonstrated how the participant should rank the exercises. Within each set of nine exercises, the participant had to search for the three exercises that he or she considered the most effective for the particular poor speller. The most effective exercise was given the score of 1, the second one the score of 2, and the third one the score of 3. Finally, the participant should give the least effective exercise the score of 9. It was considered to be too complicated and time-consuming for the participants to score all nine exercises, so no scores were given for the five exercises in between. After completing each ranking, the participants were asked to write down the reason why a particular ranking was made. Furthermore, they had to indicate the kind of additional support considered to be best in the exercises they preferred: a picture (as semantic support), the pronunciation of the word (phonological support), or both. When the participants indicated that they understood the instruction, they were asked to complete the rankings of the 12 sets of exercises, and after completing the rankings, the second part of the questionnaire was presented.

RESULTS

RANKING OF THE EXERCISES

The participants gave the scores 1, 2, and 3 to the three most effective exercises, whereas the exercise that was considered to be least effective was given the score 9. Kendall's W test (Siegel & Castellan, 1988) was used to see whether there was concordance in the rankings of the participants. Kendall's W expresses the degree of association among k sets of rankings of N objects. In this study, the sets of rankings is the same as the number of participants, so $k = 37$, and $N = 9$ as the number of exercises within a set. Kendall's W can be computed by using the formulas described by Siegel and Castellan (1988) using a $k \times N$ table within

each row as the rankings of the teachers for the exercises. The sum of each column divided by the number of teachers ($k = 37$) is the average rank for each exercise ($\bar{R}_i$). The mean of all rankings ($\bar{R}$) also needs to be calculated. After that, the coefficient of concordance can be computed by using the formula:

$$W = \frac{\sum_{i=1}^{N} (\bar{R}_i - \bar{R})^2}{N(N^2-1)/12}$$ (Siegel & Castellan, 1988)

In order to test the significance of the observed W, the χ^2 can be computed by using the formula: $\chi^2 = k\ (N - 1)\ W$ (Siegel & Castellan, 1988).

In this study, $df = N - 1 = 8$, so a χ^2 with a value of 15.51 or more would be significant ($p < .05$). Because no scores were given for the five exercises in between the best three exercises and the least effective exercise, these five exercises were coded as 6; that is, the mean score between 4 and 8. These mean scores have the same effect on the coefficient of concordance as when completely divergent scores would be given. Mean scores (tied observations) imply that less specific preferences are made and the sums of the columns will receive a more similar value, and, therefore, the value of W decreases. For example, if 24 participants would give completely divergent rankings on four exercises, each column would count up to 60 and W would show no concordance at all; the same is true when the mean number 2.5 is assigned to all the exercises. Thus, using the intermediate scores in calculating the W actually results in quite a conservative estimate of true concordance.

The results of the Kendall W test on the rankings of the participants are shown in table I. The rows show the mean rankings of the 37 participants for each set of selected words, as well as the W and χ^2 values. The columns specify the strategy that is focused on and the amount of spelling information that is displayed before the exercise begins. As is revealed in table I, for each set of selected words, the value of W varies between .10 and .38, and the χ^2 tests are significant ($p < .001$). In general, close examination of the mean rankings in table I demonstrate that the exercises with the rule strategy received the lowest (the best) scores, and the exercises with the memorizing strategy got the poorest scores.

Table I also shows that the order of the rankings is primarily based on the presented strategies and not on the amount of information revealed about the spelling of the word. With regard to the latter variable, the exercises in which the complete

TABLE I. Rankings of the Exercises, Lower Numbers Indicating More Expected Effectiveness.

		Rule Strategy			Analogy strategy			Memorizing Strategy				
		Spelling Displayed			Spelling Displayed			Spelling Displayed				
Princ.	Words	Complete	Partly	None	Complete	Partly	None	Complete	Partly	None	W	χ^2
1	cvc	3.99	3.69	4.20	4.91	5.04	5.12	5.81	5.62	6.62	.118	34.93*
	ccvcc	4.28	4.49	4.91	4.11	4.11	5.11	5.96	5.58	6.46	.096	28.50*
2	end -d	2.73	2.54	3.24	5.47	5.72	6.07	6.01	6.31	6.91	.376	111.21*
	-eer -oor -eur	3.27	3.30	3.92	5.23	5.04	5.34	6.18	6.07	6.66	.209	61.73*
	-ig	3.43	4.09	4.39	5.12	4.49	5.59	5.72	5.74	6.42	.107	31.56
	be- /ge- /ver-	4.01	4.15	5.80	4.24	4.11	4.76	5.91	5.47	6.55	.120	35.62*
	-s becomes -z-	3.16	3.16	4.16	4.74	5.55	5.34	6.47	5.80	6.61	.222	65.79*
3	-au-	3.62	3.97	4.46	5.03	5.24	5.49	5.19	5.62	6.38	.098	28.94*
	-i-	4.61	4.45	4.97	3.86	4.14	4.97	5.41	6.14	6.46	.098	28.98*
	c-	3.62	4.30	4.84	4.46	4.89	5.30	5.30	5.86	6.43	.095	28.12*
4	doubling	2.62	3.49	3.59	4.89	5.70	5.92	5.86	6.54	6.38	.271	80.38*
	reduction	2.73	3.76	3.92	5.00	5.49	5.97	5.38	6.14	6.62	.219	64.69*

Note. Princ. = Spelling Principles: 1 - regular PGCs, 2 - analogy, 3 - etymology, 4 - based on rules.

*= significant, $p < .001$.

spelling is shown are preferred to the exercises with only partial information. Offering no information at all was considered to be least effective. For most set of words, combining the rule strategy with spelling information about the whole word was considered to be the most effective exercise. Memorizing without providing any information about the spelling of the word was considered to be least effective. There were, however, a few exceptions. In words with *i*, *c*, and *be-*, *ge-*, and *ver-*, the analogy strategy also received quite good scores. Although the exercises could receive a score between 1 and 9, the means of the rankings in table I show that no exercise obtained an extremely low or extremely high score. For example, in words ending with a *d*, the lowest score was 2.54 and the highest score 6.91.

In order to examine whether the amount of experience of the teacher has an effect on the rankings, the group of remedial teachers were split into two groups: one group with less than nine years of experience ($k = 20$) and one group with more than nine years of experience ($k = 17$). The group with less experience showed significant concordances in all rankings (χ^2 between 18.43 and 74.44), whereas the group with more experience showed less concordance (χ^2 between 7.09 and 41.25), and within half of these exercises, no significant concordance was found. Considering only the sets of exercises with a significant concordance, both groups of teachers definitely showed preference for the exercises with a PGC or rule strategy.

The specific characteristics of the children were also taken into account in order to see whether these characteristics would have an effect on the rankings. The characteristics of the children were grouped into the following categories of problems (in parentheses the number of children that were reported to have these problems): auditory or phonological (26), socio-emotional, behavioral or motivation (17), concentration / attention (16), problems in applying rules (13), motor coordination / writing (6), and intellectual, low IQ (5). The teachers could name several problems, so the numbers do not add up to 37. The analysis showed that 13 of the 37 participants had a particular child in mind with specific problems in applying these rules. Still, even with these children in mind, the exercises with the rule strategy received the best scores. Analyzing the rankings based on the other characteristics of the children showed that the exercise with the rule strategy and providing the whole word spelling always received the best scores, irrespective of the specific characteristic that were mentioned.

Furthermore, we also examined the kind of additional support (pronunciation, picture, or both) preferred for exercises that were considered to be the most effective. The number of times each type of support preferred in the different exercises is reported as a percentage in table II. As is evident from this table, support with a combination of pronunciation (phonological support) and picture (semantic support) is preferred in all cases. Moreover, pronunciation is preferred more often than pictures; only for some of the words in which the orthographic patterns have etymological background are the pictures preferred over pronunciation.

FEATURES OF EFFECTIVE EXERCISES FOR SPELLING

In the questionnaire, the teachers were also asked to describe the exercises and/or procedures considered to be the most effective from their personal experience for the individual children they had in mind. As expected, a wide variety of answers were given, but some were mentioned more often than others. The answers were classified into comprehensive categories. The corresponding frequencies in terms of percentages are shown in table III. Most of the participants mentioned providing rules and phonological support as quite effective procedures for children with spelling problems. The structuring of spelling exercises by isolating similar words and the repeated spelling of words that were practiced before were also considered to be

TABLE II. Preferences of Pronunciation and Picture Support in Percentages.

Principles	Selected Words	Pronunciation	Picture	Both
1	cvc words	23	7	70
	ccvcc words	23	13	64
2	Words with end -d	24	13	63
	-eer /-oor /-eur words	21	3	76
	-ig words	28	9	63
	be- /ge- /ver- words	23	8	69
	-s becomes -z-	24	6	70
3	au words	17	20	63
	i- words	17	7	76
	c- words	12	15	73
4	Doubling the consonant	22	5	74
	Deleting one vowel	16	10	74

Note. Spelling Principles: 1- spelling to sound, 2- analogy, 3- etymology, 4- based on rules.

TABLE III. Reported Effective Exercises and Procedures (in percentages).

Effective exercises and procedures	Percentage
Providing explicit rules	41
Phonological support	38
Structuring into similar words	27
Repeating of practiced words	24
Reading exercises	14
Transfer/generalisation of spelling rules	14

Note. Participants could have mentioned more than one exercise or procedure

quite important. However, no new information about effective spelling exercises was provided. The participants did not mention any new type of exercise or procedure that they considered to be effective for poor spellers.

In the questionnaire, the participants were also asked whether they agreed with the proposition that "rules are beneficial for children with spelling problems." Most of the participants (67 percent) fully agreed with this proposition; rules can serve as a scaffold for the children and make children more aware of the presented spelling problem. Twenty-two percent were more reserved but still stated that using rules could be effective to some extent, and that only children with a normal or high IQ and a good memory would be able to apply rules successfully. The remaining participants (11 percent) would not recommend the stipulation of rules for poor spellers because most rules would be too complicated, especially for children with memory problems. Finally, in the questionnaire, the participants were asked explicitly to ask questions or to make some remarks on the study. They suggested "structuring of exercises by offering easy exercises first and later the more difficult ones" and "using a computer could be helpful." Nevertheless, they made no suggestions on the use of other spelling methods or exercises that they considered to be quite effective.

DISCUSSION

Because there is scarce empirical evidence on the type of instruction that can be used in helping dyslexic children improve their spelling skills, the present study sought to explore teachers' knowledge and beliefs about appropriate instructional and

practice conditions. Based on their extensive experience in providing individualized help to children with serious literacy problems, specialized remedial teachers were asked to rank exercises that systematically varied various elements, and to explain and comment on their judgments. The results show that the participants based their rankings primarily on the strategies that were called on in the exercises. Strategies are considered to be more important than how much information is revealed about the spelling of the word.

A variety of spelling problems was presented for evaluation and it was expected that preferences for exercises would interact with the different kinds of words. In contrast, the data show that rankings are very similar for the words of the different spelling principles, and that providing a combination of spelling rules and showing the whole orthographic pattern of the word are preferred in all 12 sets of exercises. Most participants explained that a simple and comprehensible rule would help poor spellers focus on their spelling problems and understand these problems more thoroughly. The results are consistent with the findings of Templeton and Morris (1999), who found that providing explicit instruction is considered to be the best for children to spell words correctly. We hypothesized that the rule strategy could best be combined with the presentation of only a part of the word. The teachers, however, considered presenting the complete word to be the most effective way to teach spelling because providing the whole word helps children remember the correct and complete spelling more effectively.

In most of the sets of exercises, a focus on the rule strategy was considered as the most effective exercises, but it should be mentioned that some of the rules were rather artificial. For example, for the etymologically based spelling of *au*, in some published methods of spelling instruction, children first have to remember a story with many frequent *au* words in it, and then can use the artificial rule: "If the word is in the story, than spell the word with *au*, otherwise you can use *ou*." Using such a rule requires memorizing the story (cf. "story mnemonics" in Searleman & Herrmann, 1994). It seems odd that although memorizing of the spelling of words is not considered to be effective, learning to memorize stories and specific rules is thought to be quite effective at the same time. It is not unlikely that the emphasis on the use of rules is primarily based on the propensity of teachers to prefer exercises in which children are focused on the specific difficulties in spelling, and that they would concur with attempts to make such rules as simple as possible.

Although no exercise was considered to be extremely ineffective, the rankings show that exercises that focused on memorizing without information about the spelling of the word were considered to be the least effective. More than half of the participants asserted explicitly that the memorizing strategy would not help gain a better understanding of the spelling problem. Furthermore, although some participants remarked that it would be quite effective to write the word one more time after the provided feedback, they also remarked that copying the words five times would have a discouraging effect on the children.

In words with prefixes *be-*, *ge-* and *ver-*, and words with *c* or *i*, the analogy strategy was also mentioned as quite effective. This result may partly be based on some of the participants who believed that these kinds of words could well be arranged so that an analogy strategy would focus the children on one pattern at a time. In general, participants considered the grouping of similar words as quite important, which was confirmed by further remarks of the participants in the questionnaire. Some of the participants commented that providing the analogy strategy alone would not yield sufficient information about the spelling problem, but combining the rule with an analogy strategy would create a perfect exercise. Finally, some participants warned that applying rules during exercises is sometimes too difficult for poor spellers, and that an easy solution in terms of use of rules is not always possible.

Whereas in the previous study of Bos and Reitsma (in press) a set of exercises varying only in one element was presented to 40 teachers, in the present study, the features of exercises were manipulated for 37 teachers so that interactions were allowed. Surprisingly, the data revealed that the present group of teachers did not show much differentiation; their preferences were simply an additive effect of the elements also ranked as the most effective by the previous group of 40 teachers. Both groups of remedial teachers, in total 77, highly agreed on the distinguishing features of exercises that, according to their experience, would be the most effective for children with serious problems in spelling.

In discussing ways of remediating problems in spelling, remedial teachers quite frequently pronounce that for optimal results, one has to adapt carefully the treatment to the specific needs of the individual children. The general perspective of aptitude-treatment interactions has always been very popular. Their inventory of descriptions of the children clearly reveals

some characteristics that indeed might be quite relevant for individual differentiation, for example, differences in IQ and phonological, behavioral, or attention problems. The results, however, show that providing exercises with rule strategies and presenting the whole word orthographic pattern is considered to be the most effective way of teaching spelling for all children, despite their specific characteristics. In this respect, it should be mentioned that participants gave their responses according to their experience with children of about 10 years of age. Although the participants did not make any remarks considering the age of the children, it is possible that answers and rankings would be different if their experience were based on younger or older children. Although in the current study some participants explicitly remarked that no generalizations could be made because of different characteristics of the children, no interactions with specific characteristics, neither in the ranking data nor in the further comments of the teachers, were found. Instead, a high concordance for the whole group of participants was established without discernible deviations or interactions. It seems necessary, therefore, to investigate more rigorously the influence of different characteristics of children on the results of spelling exercises before valid and reliable conclusions can be drawn on individual adaptations of spelling exercises.

As could be expected in a rather transparent language like Dutch, support by pronunciation (phonological support) was preferred to pictures (semantic support) in most of the spelling exercises. But teachers most often preferred a combination of pronunciation and pictures. Although in the current study the participants made no attempts to explain why they had chosen the combination of pronunciation and pictures, they may have been influenced by the fact that pictures often make the exercises more attractive. Yet adding a picture is only one of the possible ways to support the spelling semantically; providing a story or sentence context could also serve the same semantic purpose. Nevertheless, in the current study, the importance of semantics was not emphasized during ranking nor mentioned during the interviews, whereas the importance of phonological elements was mentioned quite often, thus suggesting that phonological support is considered to be more important than semantic support.

This study can be regarded as a promising way to gain some knowledge of the most effective ways in teaching spelling to poor spellers. The results are, however, definitely not conclusive with regard to issues of effect. Although we asked the remedial teachers explicitly to make the rankings based on their

own experience, and most of them had many years of experience, it is uncertain whether they really based their judgments on a systematic or thorough evaluation of their own experiences. Alternatively, rankings and comments may be informed by general theoretical knowledge about spelling, common practices, available materials and methods, and the like. In the examples of exercises, we actually included some of the elements that are regularly used in spelling methods, but excluded, for example, morphological considerations, or the question whether it would be more advantageous to require the child to spell the word completely as compared to only filling in some crucial elements. Although these elements were left out, some of the variations of these elements could be quite effective, or even more effective than the exercises described in the present study. Still, the participants did not mention any new aspects or other exercises that could be more effective.

While remaining open-minded in order to find out the kind of spelling exercises that could really be helpful to children with spelling problems, controlled training studies are needed to make further progress. Also, it would be interesting to see whether experienced remedial teachers in other countries, and other orthographies, would reach the same conclusions found in this study and in the study by Bos and Reitsma (in press). Given the fact that there is a strong preference for certain exercises irrespective of the specific rule or spelling problem, our hypothesis is that the present findings for the problems in learning to spell using Dutch orthography can be generalized. But again, well-controlled treatment studies in cross-language and cross linguistic cooperative research will also be needed to verify whether poor spellers would indeed profit most from the exercises that our participants considered to be most effective.

CONCLUSIONS

The expertise of remedial teachers was used to learn about what they considered to be effective ways in teaching spelling to poor spellers. The results show that the use of rules is preferred for all kinds of words and that providing help by showing the complete spelling of the word is considered to be the most effective. Although it is often assumed that remediation programs should take into account the individual characteristics of the child, the participants of the present study considered a rule-based strategy to be the most effective, irrespective

of children's IQ, phonological skill, or attention. In further research, it should be examined whether poor spellers would indeed profit most from the exercises that the participants considered to be most effective, by having these children practice with exercises and by systematically evaluating their progress. It should be further investigated if the different characteristics of the children could have any influence on the effect of the spelling exercises.

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